“Beyond the Big Bang” Notes

Aristotle

1. Said the earth was round because of three pieces of evidence
   1. Eclipses of the Earth on the moon show a round shadow of the Earth
   2. Polaris appeared lower in the sky as you travel south
   3. The sail of a ship is visible first as it approaches the horizon
2. Earth is stationary, and the Sun, Moon, and stars orbited the Earth

Ptolemy

1. Took Aristotle’s ideas and made a cosmological model that he could use to predict objects locations in the night sky
2. Thought Earth was surrounded by 7 spheres: sun, moon, and the five known planets (Mercury, Venus, Mars, Jupiter, Saturn) but the stars were stationary

Copernicus

1. Came up with a smaller model that had the sun at the center- heliocentrism
2. Planets, including Earth, orbited the Sun in circular patterns

Kepler

1. Planets orbit the sun in elliptical orbits that are not quite centered around the sun
2. As planets get close to the sun, they move faster in their orbits than when they are further from the sun in their orbits

Galileo

1. Perfected a rudimentary telescope to see 30 X power.
   1. He observed the largest four moons of Jupiter
2. Said all objects, regardless of mass, fall at the same rate

Newton

1. Principia- book Newton published on the physical laws of nature (forces, motion, and gravity)
2. All objects in the universe exert a force on all other objects. The more massive the objects, the stronger the force. Also, the closer the objects are to one another, the stronger the gravitational attraction

Einstein

1. All objects in space exist on a fabric of “space time”- Special Relativity- all objects, even light, can be bent by gravity.
2. Massive objects bend the fabric down and cause other objects on it to move towards it
3. He liked to think the universe was eternal (always existed and always will exist), but his theory of general relativity contradicted his beliefs
4. Theory of General Relativity said that all objects in space should be collapsing because of their attraction to everything else, but they’re not. The only way to explain this was that the universe must be expanding. If the universe is expanding, then at some point in the past it must have been born from an infinitely small point… and Einstein wanted to believe the universe was eternal so he denied his own evidence.

Edington

1. Proved during a solar eclipse that light is bent by gravity of the sun. Stars that should appear behind the sun were appearing just next to the sun
2. This proved Einstein’s theory of Special Relativity, and made him famous